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Notes on some HYDROBIINI of Boreal America.

BY GEO. H. HORN, M. D.

The genera and species of this tribe, as far as they were then known to me, were made the subject of a study and the results published in *Proceedings Amer. Philos. Soc.* 1873, pp. 118-137. The basis of this work was furnished by the collection of Dr. LeConte, together with my own, so that the species were represented in most cases by fair series of specimens with very few uniques. Since that time but three species have been described, although numerous collections have been made, adding greatly to our series of those known.

In the generic division, adopted in the above-mentioned paper, a very conservative course was followed, and only those genera which had received the sanction of Lacordaire and the authors of the "Catalogus" were recognized. Numerous subdivisions of *Hydrobius* and *Philydrus* had been proposed, notably by Mulsant and Thomson, which were not viewed with much favor at the time of my essay. In 1870 (*Ent. Mo. Mag.* p. 373), Dr. Sharp added to our knowledge of some of these genera by amplifying the diagnoses and illustrating them by some well executed detail sketches drawn by Mr. Rye, although he did not at the time seem to have a thorough conviction of the validity of the greater number of them.

In 1881, Mr. Bedel (*Faune du Bassin de la Seine*) admits the validity of *Paracymus* and *Anacæna* of Thomson, and *Helochares* of Mulsant, at the same time suggesting two new genera: *Crenitis*, separated from *Hydrobius* and *Cymbiodyta* from *Philydrus*.

More recently Dr. Sharp has studied the species of the Central American fauna (*Biol. Cent. Am.* 1, 2) with the result of adding *Metacymus*, *Sindolus*, *Chasmogenus* and *Hydrocombis*, the first being related to the small *Hydrobius* forms, the last three to *Philydrus*. He has not admitted any of the genera into which *Hydrobius* had been divided.

The object of the present paper is to give the the results of a study of the species in our fauna in their relation to the genera which have been proposed by the various authors above cited and at the same time it is hoped to define the species more sharply by the important aid afforded by vastly increased material and the discovery in them of sexual characters which have proven of great utility.

The tribe Hydrobiini has been restricted by Bedel to Laccobius, Philydrus and Hydrobius, together with any subdivisions of the last two. Helopeltis may be removed by the form of the head (Pl. iv, fig. 21) and concealed labrum. Dr. Sharp observes that the anterior coxal cavities are closed behind, while in the other genera they are open.

The present study is practically narrowed to the species formerly considered by me as belonging to Philydrus and Hydrobius, and as any genera which follow are dismemberments from these, the discussion is best begun by giving the characters separating them :

Terminal joint of maxillary palpus rarely as long, usually shorter than the preceding joint.....**PHILYDRUS.**
Terminal joint of maxillary palpus always longer than the preceding joint.
HYDROBIUS.

It will be observed in all the species of Hydrobius as above defined, that the terminal joint of the maxillary palpus always bends inward toward the other joints and in the same plane as is usual with palpi generally; but in Philydrus the terminal joint is so articulated that it bends downward as well, and is less inclined to bend toward the mouth.

The aggregate above separated as Philydrus has been divided into six parts, defined by the following characters, which, for convenience, are reduced to a tabular form.

Tarsi 5-jointed on all the feet.....	2.
Tarsi 4-jointed on the middle and hind feet.....	4.
2.—Second joint of maxillary palpi* curved with the convexity to the front; mesosternum laminate.....	PHILYDRUS.
Second joint curved with the convexity posterior.....	3.
3.—Mentum with anterior border entire; mesosternum with median longitudinal lamina; elytra without sutural stria.....	SINDOLUS.
Mentum with a slight notch† at middle; mesosternum not carinate; elytra striate or not.....	HELOCHARES.
Mentum regularly impressed at middle, the middle of the anterior border deeply semicircularly emarginate; mesosternum prominent in a longitudinal manner along the middle; sutural stria distinct.....	CHASMOGENUS.
4.—Mesosternum with a slight transverse elevation, a little in front of the coxæ; prothorax without basal marginal line; elytra with sutural stria.	HYDROCOMBUS.
Mesosternum longitudinally carinate; prothorax without basal marginal line; elytra with sutural stria.....	CYMBIODYTA.

* Called for convenience in the subsequent pages "pseudo-basal joint."

† "But the structure of the neighboring parts renders this character very difficult of verification (Sharp, Biol. i, 2, p. 74)."

In the preceding table all those characters have been introduced which seem to have been deemed of importance by Dr. Sharp or Mr. Bedel, the object of the tabular arrangement being to avoid unnecessary repetition and to render the genera more easily comprehensible in their mutual relations.

To the acute observation of Dr. Sharp we owe the discovery of two really important characters—the structure of the tarsi and the form of the pseudo-basal joint of the maxillary palpi.

In all the members of the tribe Hydrobiini the first joint of the middle and hind tarsi is very short and not easily observed, but in two of the above genera the first joint has entirely disappeared, having, doubtless, become completely fused with the second without trace of suture.

The curving of the pseudo-basal joint of the maxillary palpus with the convexity forward in *Philydrus* and the reverse in other genera, is a well marked character of great utility after those species are removed from consideration which have heteromerous tarsi, as in several *Cymbiodyta* that joint is quite straight.

The genus *Philydrus* as limited above, seems to be a very homogeneous assemblage of species, all of them having a well marked mesosternal lamina (with exception of *ochraceus*), while several have the prosternum more or less carinate. It is well to observe here that *Philydrus* is the only genus with a well marked mesosternal lamina, as in all the other genera in which a mesosternal prominence exists the form is traceable in its derivation to a transverse ridge (Pl. iii, fig. 18).

Philydrus is the most numerously represented genus in our fauna and contains all those referred to it in my former paper, excepting those hereafter mentioned.

Sindolus Sharp is not represented in our fauna.

Helochares Muls., as restricted by Sharp and Bedel, is represented by *maculicollis*.

Chasmogenus Sharp, with the mesosternum merely protuberant and the mentum semicircularly emarginate in front, is represented by *normatus*, in which, however, the emargination of the mentum is rather less than the description of Dr. Sharp indicates, and there is no smooth submental area. The prominence of the mesosternum is variable, individually, as has been observed by Dr. Sharp, in some being merely an obtuse protuberance, in others quite acute, so that, as he observes, there is really a rudiment of a lamina. Notwith-

standing the fact that our species possesses the essential characters of *Chasmogenus*, even to its manner of mesosternal variation, I am disposed to place it with *Helochares*, the more so as it resembles very closely the species already placed there. While I am not prepared to say that *Chasmogenus* should be suppressed (not having seen a typical species), I am rather disinclined to admit the name in our fauna for a species which has all its essential characters.

The genera which follow in the table, *Cymbiodyta* and *Hydrocombis*, are well separated from the others by the 4-jointed middle and hind tarsi. These two genera are said to differ in the structure of the mesosternum. To Dr. Sharp I am indebted for the species typical of *Cymbiodyta* (*marginella* Fab.), although Bedel includes *fimbriata* in it. An examination of our species and *marginella* shows plainly what has already been indicated, that all the forms of mesosternal protuberance, except in *Philydrus* are derivations from a transverse ridge. In our fauna the simplest form is seen in *lacustris*, from which the ridge first becomes longer, then arched, then elevated in its middle, so that when viewed directly from behind the ridge is in form like A, the entire elevation being somewhat pyramidal in form. These variations are illustrated on Pl. iii, fig. 18, *a, b, c, d, e*. I have, therefore, no hesitation in asserting that *Hydrocombis* cannot be separated from *Cymbiodyta*. To *Cymbiodyta* should be referred all those species formerly placed by me in *Helochares*, except *maculicollis*.

On the other hand one of our species with the tarsal structure of *Cymbiodyta* cannot be referred to it. The mesosternum in front of the coxæ is elevated in a rather slender, compressed conical process, and the claws are abruptly dilated in the male at base, less in female. The palpi are also very long and slender. For the species *bifidus* Lec. I propose the generic name *Helocombis*.

The genera which are known to occur in our fauna and seem entitled to recognition are as follows:

Tarsi 5-jointed on all the feet.

Pseudo-basal joint of maxillary palpus curved with the convexity anteriorly; mesosternum with a longitudinal lamina; tarsal claws toothed in male with few exceptions..... **Philydrus.**

Pseudo-basal joint curved with the convexity posteriorly; mesosternum, at most, feebly protuberant; tarsal claws simple..... **Helochares.**

Tarsi 4-jointed on the middle and posterior feet; pseudo-basal joint of maxillary palpus either straight or slightly curved posteriorly.

Mesosternum with a feeble transverse carina, sometimes elevated at middle, forming a slight pyramidal protuberance; maxillary palpi not longer than in *Philydrus*; tarsal claws simple..... **Cymbiodyta.**

Mesosternum with a compressed conical process; maxillary palpi long and slender; claws broadly toothed at base in male, less in female.

Helocombus.

PHILYDRUS Sol.

The characters of this genus have been so often and so well given, that it is not necessary to dwell further at this time on those by means of which the genus may be known from others to which it is most closely related. Some few points will be alluded to here in order to avoid their frequent repetition in the specific descriptions.

Each species seems to be invariable in color, excepting such apparent variation as may be due either to evident immaturity or the mode of preparation for the cabinet. The five following—*carinatus*, *cuspidatus*, *cinctus*, *consors* and *perplexus* are truly piceous in color, the others are various shades, usually called testaceous, with the qualifying adjectives piceo, brunneo or pale, according to the species or specimen.

The sculpture consists of a punctuation, very regularly disposed over the surface, which is never coarse, nor is it ever densely placed, the distance between the punctures being at least their own diameter and sometimes more, but in *cinctus* it is rather closer than usual.

On the head in front of and within each eye is an arcuate row of coarser punctures. The thorax has two series on each side of coarse punctures, one beginning near the front angle arching inward and backward toward the middle, the other row transverse beginning at the middle of the lateral margin. At the base of the thorax is a fine marginal line very well marked in all the species, except *nebulosus*, *cinctus* and *ochraceus*, where it is extremely faint or entirely absent.

The elytra have four rows of coarser punctures, that one nearest the side margin is very irregular and contains the most punctures, the three rows between this and the suture are more regular and with fewer and more distant punctures. In some species these series are very indistinct. All the species have the sutural stria well impressed from the apex three-fourths to base, where it is gradually evanescent. Pl. iii, fig. 2.

Sexual structures have been observed in nearly all our species of such an obvious nature that it is remarkable that no mention has been made of them. In nearly all of our species the males have at

least one of the claws of the front tarsus distinctly toothed at base, and in *reflexipennis*, *diffusus* and *Hamiltoni*, the tooth is so large, and in the last two so everted, that when the tarsus is seen directly from above it seems tridactyle. As there are differences between nearly all the species these will be more fully alluded to in their proper place.

Failure to notice the sexual characters led me, in 1873, to attach too great importance to the form of the mesosternal lamina in the separation of species. It is now known that the form of the lamina is by no means constant in a series of specimens, nor is it of the same form in the sexes. As a rule the males have the more prominent lamina, the angle more prominent and the anterior edge more oblique, while in the female the angle approaches more nearly a right angle by the front edge being more nearly vertical. This is well illustrated in the various forms observed in *nebulosus*. Profile views are given of all the laminae drawn in every instance from the male.

In those testaceous species with black head it will be observed that the male has usually the anterior half of the head pale while in the female the head is entirely piceous, except a triangular space before each eye.

All our species are entirely piceous and opaque beneath, the femora are also opaque, densely punctured and pubescent, except for a short distance at apex.

The differences in the structure of the maxillary palpi afford the means of subdividing the genus into two primary groups, as follows: Last two joints of maxillary palpi nearly equal in length...S. G. **ENOCHRUS**. Last joint always shorter than the third.....S. G. **PHILYDRUS**.

ENOCHRUS Thoms.

This subgenus contains in our fauna three species, two of which have the prosternum longitudinally carinate.

Prosternum carinate.

Entirely piceous, tarsi alone pale; anterior claw of male slightly angulate at base.....**carinatus**.

Thorax, elytra, tibiae and tarsi pale rufo-testaceous, head and under side piceous; anterior claw of male very distinctly toothed.....**fucatus**.

Prosternum not carinate.

Piceous, sides of head and thorax pale.....**cuspidatus**.

But one other species, *bicolor* Payk, of Northern Europe is known; our species are from the Western side of the continent and still further illustrate the relationship, which has already been alluded to, between the faunæ of the Pacific region and Europe.

PHILYDRUS Sol.

The remainder of our species belong to this series. One only is peculiar to California, the others are Eastern, although one-half of them extend in their distribution across the continent to California.

The species may be arranged in the following manner:

- Prosternum distinctly carinate.....**nebulosus**.
 Prosternum not carinate.
 Mesosternal lamina very feeble.....**ochraceus**.
 Mesosternal lamina well developed and with a distinct angular projection.
 Anterior claws of male not distinctly toothed, although with a basal angulation; piceous species.....2.
 Anterior claws, at least, well toothed in male; species more or less testaceous (except *consors*).....3.
 2.—Subdepressed species, sides of elytra gradually obliquely descending; basal marginal line of thorax always distinct; claws of male scarcely broader at base.....**perplexus**.
 Transversely very convex, sides of elytra almost vertical; basal marginal line extremely indistinct; front claw of male slightly angulate at base.....**cinctus**.
 3.—The front (or inner) claw of anterior tarsus of male alone toothed.
 Entirely piceous, transversely very convex, sides nearly vertical; large species.....**consors**.
 Brownish testaceous, head alone piceous; broadly oval, subdepressed species.....**californicus**.
 At least one claw on each tarsus of male toothed.
 Head more or less piceous.
 Thorax with large discal piceous space.....**Hamiltoni**.
 Thorax entirely testaceous.....**diffusus**.
 Head and entire upper surface testaceous.....**reflexipennis**.

The species of this genus are peculiarly distributed. Of those belonging to the section *Enochrus*, two are restricted to the Pacific coast region (*carinatus*, *cuspidatus*), the third (*fucatus*) is from the adjacent regions of Utah and Arizona. Of *Philydrus* proper but one (*californicus*) is restricted to the West coast, all the rest may be considered Atlantic region species, although several extend across the continent to California and Oregon.

P. carinatus Lec.—Oblong oval, slightly narrower in front, pitchy black, shining, sides of thorax sometimes a little paler, surface comparatively coarsely and closely punctate, the elytra with the usual series of coarser punctures, in which, however, the punctures are few. Thorax with an arcuate row of coarse punctures which begins near the front angles, extending toward the middle, a second series extending transversely inward from the middle of the lateral margin. Body beneath black. Legs black, the tarsi above pale. Length .20 inch.; 5 mm. Pl. iii, fig. 7.

The prosternal carina is feebly elevated, except in front, where it is prolonged in a short dentiform process. The mesosternal lamina is broadly triangular, the lower edge oblique to the axis of the body, the anterior edge also oblique, the angle acute, sometimes slightly dentiform.

The males have both the anterior claws similarly dilated at base, but not forming a distinct tooth, the middle claws less dilated, the posterior simple. In the female the front claws are very slightly broader at base, the middle and posterior simple.

One ♀ specimen in my cabinet has the legs entirely rufo-testaceous, but does not seem to differ in any important structural characters, and while it may indicate a distinct species, it is retained here until a similar male is found.

Occurs in Oregon and California.

P. fucatus Horn.—Oblong oval, distinctly narrower in front, moderately convex, yellowish testaceous or ochraceous, head entirely piceous black, body beneath black, tibiae and tarsi pale. Thorax finely, moderately closely punctate, the anterior oblique row of larger punctures distinct, the transverse series indistinct. Elytra a little less closely punctate than the thorax, punctures less impressed, but a little more distant and coarser toward the apex, the punctures of the usual larger series indistinct. Length .20—.22 inch.; 5—5.5 mm. Pl. iii, fig. 10.

The prosternal carina is well elevated at the anterior end. The mesosternal carina horizontal beneath, nearly vertical and slightly sinuous in front, the free angle slightly mucronate.

Front claws of male equal, each rectangularly toothed, middle claws toothed, posterior claws broadened at base. In the female the front claw is like the middle claw of the male, the middle claw slightly thickened at base, the posterior claw simple.

The surface is quite shining, as if varnished. In the few specimens examined it seems not to vary appreciably.

Occurs in Utah and Arizona.

P. cuspidatus Lec.—Oval, slightly oblong, a little narrower in front, moderately convex, piceous black, sides of thorax distinctly, of elytra very indistinctly paler. Head black, a large pale space in front of each eye, moderately closely punctate, with the usual arcuate series of coarser punctures. Thorax piceous, sides paler, the same color extending narrowly along the apex, surface moderately coarsely and closely punctate, more finely at middle, the usual arcuate and transverse series of coarser punctures. Elytra punctate similarly to the thorax, but more coarsely and less closely near the apex, the usual series of coarse punctures not well defined on the disc, but deep and coarse near the apex. Body beneath piceous, opaque. Legs piceous, opaque, tibiae and tarsi paler. Length .14 inch.; 3.5 mm.

Prosternum not carinate, mesosternum with a stout lamina, the lower edge horizontal and sinuous, the apex mucronate.

The only specimen before me is a male in not good condition, enough remains to show that on the front feet the claws are dilated at base, but not forming a distinct tooth, the middle claws less dilated, the posterior very feebly.

It is hardly to be wondered at that this species should have been referred to *Hydrobius*, considering its rather small size, and that the last two joints of the palpi are of about equal length, although the presence of a mesosternal *lamina* in place of a protuberance should have been suggestive.

In the light of our present knowledge of the value of the form of the pseudo-basal joint of the maxillary palpus and the presence of the coarser series of punctures on the head, thorax and elytra, the true position of the species becomes evident.

Although smaller, the species is closely related to *carinatus*, differing from that in the absence of any prosternal carina. This, however, seems rather a variable structure, so that future collections may show this to be merely a variation.

Occurs in the mountain regions of California near Lake Tahoe.

P. nebulosus Say.—Oval, slightly oblong, convex, shining, above variable* from pale yellowish testaceous to brownish testaceous, head entirely piceous, except a pale space in front of each eye, the clypeus of ♂ usually paler than the female. Thorax rather sparsely and indistinctly punctate, the punctures separated by two or three times their own diameters, the arcuate and transverse rows of coarser punctures very indistinct, basal marginal line either very indistinct or absent. Elytra punctured similarly to the thorax, the punctures more distant near the apex, the usual rows of coarser punctures scarcely discernible. Body beneath piceous, opaque; femora piceous, tibiae and tarsi rufo-testaceous. Length .14—.18 inch.; 3.5—4.5 mm. Pl. iii, fig. 13.

The prosternum is distinctly carinate longitudinally, the carina more elevated in front.

The mesosternal lamina is prominent, but somewhat variable in form sexually and individually. In the male the lamina is somewhat triangular in form, the free edges oblique, the angle acute. In the female the lamina is more nearly square, the lower edge slightly oblique, the front either slightly oblique, or nearly vertical, the angle sometimes slightly mucronate.

In the male the claws of the front feet are dissimilar, the anterior claw having a moderate quadrangular tooth, the posterior simply angulate at base. The claws of the middle feet are also dissimilar,

* The variability in color seems due rather to the mode of collection and preservation than to an actual difference in nature.

the anterior claw being less distinctly toothed than the anterior claw of the front foot, the posterior claw is also less angulate. The posterior claws are more nearly alike, the apical portion being somewhat irregular as in *reflexipennis*, with a quadrangular tooth at base, which is less developed on the posterior or inner claw.

The claws are similar on all the feet in the female, being more slender than in the male and merely a little broadened at base.

The variation in color has already been alluded to as dependent more on the mode of preparation than to any real difference in freshly captured specimens. No specimen is ever truly piceous.

The punctuation varies to a degree which has caused the separation of forms unnecessarily. In Northern specimens (Canada) the punctuation is well marked, although no specimens have been seen in which there is any sharpness of definition or closeness of punctuation seen in nearly all the other species. The more we approach the warmer regions of the South (Arizona and California) the smoother the specimens become, and in some of them it is nearly impossible to detect any punctuation at all.

The rather small size of this species will enable it to be readily known at a glance from the others, except the immature forms of *ochraceus*, but the sternal structure will enable it to be separated.

The preceding remarks will explain the reason of uniting *cristatus* and *pectoralis* with the present species. In my former essay these were separated on the sculpture and form of mesosternal lamina, which are now seen to be variable either from locality in the case of sculpture, or sexually in the form of the mesosternal lamina.

Several species described by Motschulsky are considered identical *latiusculus*, *obtusiusculus* and *maculifrons*.

Zimmermann (Trans. Am. Ent. Soc. ii, p. 250) has placed *nebulosus* as a synonym of *Hydrophilus pygmaeus* Fab., described from meridional America, without any good reason for so doing, although the description will not only fit this species, but quite a good number of others within the limits of the Fabrician acceptance of *Hydrophilus*.

Occurs from Canada and the N. E. States to Texas, Arizona and California.

P. ochraceus Mels.—Elliptical, less convex, shining, pale piceous, or piceotestaceous, head always piceous with a paler space in front of each eye, the clypeus of male paler. Thorax distinctly and moderately closely punctate, the arcuate and transverse series of coarser punctures barely distinct, the basal mar-

ginal line very feebly indicated. Elytra punctured similarly to the thorax, the punctures more distant and a little coarser near the apex, the usual series of larger punctures extremely indistinct. Body beneath piceous opaque. Femora piceous, tibiae and tarsi rufo-testaceous. Length .14—.16 inch.; 3.5—4 mm. Pl. iii, fig. 14.

The mesosternal carina is very feebly prominent, the anterior edge arcuate, without distinct angle.

The claws in both sexes are so nearly like those of *nebulosus* that it is unnecessary to describe them.

This species varies in color, and probably from the same causes as have already been referred to in *nebulosus*. No specimen has been seen of truly piceous color in the manner illustrated by *cinctus* or *perplexus*.

Occurs from Canada to Illinois and Florida. Dr. Sharp notes its occurrence in Mexico.

P. perplexus Lec.—Oblong oval, fully twice as long as wide, piceous black, shining, the sides of the thorax and elytra with paler border, a paler spot usually in front of the eyes. Thorax closely punctate, the punctures finer at the middle than at the sides, the arcuate and transverse rows of coarser punctures distinct, but not deeply impressed. Elytral punctuation coarser than the thorax, closer toward the base, sparser and coarser toward apex, the usual series of larger punctures feebly indicated. Body beneath and legs piceous, tarsi paler. Length .16—.22 inch.; 4—5.5 mm. Pl. iii, fig. 6.

The mesosternal lamina is prominent, the lower edge slightly oblique, the anterior edge slightly sinuous and oblique, the free angle more or less mucronate.

The claws of the male are merely slightly broader at base and do not differ from those of the female except in being a very little stouter.

Canada and New England States to Florida and Texas.

P. cinctus Say.—Oval, slightly oblong, very convex transversely, sides of elytra nearly vertical, piceous black shining, the sides of thorax and elytra with paler border. Thorax closely punctate, the oblique and transverse rows of coarser punctures distinct, but feebly impressed, basal marginal line, at best, feebly developed and never entire. Elytra a very little more coarsely, but less closely punctured than the thorax, the usual rows of coarser punctures distinct, but feebly impressed. Body beneath and legs black, the tarsi pale. Length .26—.28 inch.; 6.5—7 mm. Pl. iii, fig. 5.

The mesosternal lamina is moderately thick, the lower edge horizontal, the front edge nearly vertical, the free angle slightly mucronate. In the female the anterior edge is more oblique.

The anterior claws of male have each an irregular basal dilatation, but not forming a distinct tooth, the middle claws are less angulate and the posterior are nearly simple. The anterior and middle claws of the female have a very feeble basal dilatation, the posterior claws nearly simple.

This species, from its facies, seems to be most closely allied to *consors*, an association which is further indicated by the form of the male organ, but the claws are not, properly speaking, toothed. For the latter reason it is better associated with *perplexus*, which has the claws even less angulate at base.

Occurs from Canada and the New England States westward to Kansas and South to Georgia.

P. consors Lec.—Oblong, black, shining, transversely very convex, sides of elytra nearly vertical, underside and legs entirely black, tarsi slightly paler. Thorax very finely punctate, smoother at the sides, the anterior oblique and the median transverse row of coarse punctures very well marked, basal marginal line distinct in its entire length. Elytra a little more coarsely, but less closely punctured than the thorax and more indistinct toward the apex, the usual rows of coarser punctures indistinctly impressed. Length .28—.32 inch.; 7—8 mm. Pl. iii, fig. 4.

The mesosternal lamina is triangular, the lower edge oblique to the axis of the body, the front edge nearly vertical, free angle acute, but not mucronate.

The front claws of the male are very nearly alike, each being broadly toothed, the free angle of the tooth acute, the middle and posterior claws are simply a little broader at base. In the females the claws are simply a little broader at base and less curved than in the male.

Resembles *cinctus*, but slightly more oblong in form, without a paler border and with different mesosternal lamina and male claws.

Occurs in Louisiana and Florida (Schwarz).

P. californicus n. sp.—Broadly oval, less convex, brownish testaceous, head behind the suture piceous in both sexes, the clypeus pale ♂, or with a broad median space piceous ♀. Thorax moderately closely punctate, the arcuate and transverse series feebly indicated, hind angles very obtuse. Elytra punctured similarly to the thorax, but more sparsely near the apex, the usual series of coarser punctures very faintly indicated. Body beneath opaque black. Femora piceous, tibiae and tarsi pale. Length .18—.20 inch.; 4.5—5 mm. Pl. iii, fig. 8.

Mesosternal plate not prominent, the lower edge slightly oblique, the front oblique, the angle not mucronate.

In the male the anterior claws are dissimilar, the front claw having a quadrangular dilatation at base, the posterior merely slightly broader. The middle claws are equal and merely slightly angulate at base. The posterior claws are equal and slightly broader at base.

In the female the claws are alike on all the feet. They are more slender than in the male, and very slightly broadened at base.

Among the species with pale elytra, simple prosternum and toothed claws, the present species is known by its much broader and more depressed form, and in the male by the claws being very feebly toothed in comparison with what is observed in the other forms.

This species was formerly considered by me as *latiusculus* Mots.

Occurs in California (probably northern).

P. Hamiltoni n. sp.—Oblong oval, scarcely narrowed in front, moderately convex, above piceo-testaceous or pale brownish, head behind the suture piceous, clypeus usually testaceous ♂, or broadly piceous at middle ♀; thorax with an indefinite, semi-circular space piceous, a small dark spot on each umbone. Thorax not very closely punctate, smoother near the sides, the usual arcuate and transverse series of coarser punctures extremely indistinct. Elytra a little more coarsely punctured than the thorax, toward the apex more sparsely and less deeply, the discal rows of coarser punctures scarcely discernible. Body beneath and femora opaque black, the trochanters, tibiae and tarsi testaceous. Length .16—.22 inch.; 4—5.5 mm. Pl. iii, fig. 9.

The mesosternal lamina is moderately prominent, the lower edge horizontal, the anterior edge vertical and sinuous. the angle distinctly mucronate.

The anterior pair of claws of the male are dissimilar, the front claw having a long lobe-like, obtuse tooth at base, which is slightly everted, the hinder claw rectangularly toothed. The middle pair of claws are similar, and each has a broad rectangular tooth. The posterior claws are smaller, slightly irregular in shape, each has an acute tooth at base smaller than in the middle claws. The claws of the female are alike on all the feet, and are merely broadened at base.

This species might readily be mistaken for a larger *reflexipennis* when recently captured specimens are compared, a resemblance which is increased by a slight explanation of the sides of the elytra near the apex. It will be observed, however, that in *reflexipennis* the head is always entirely pale, as also the thorax, while in the present species the posterior portion of head, at least, is piceous. The darker disc of the thorax is present, with very rare exception, while in *reflexipennis* it is never so.

The characters observed in the male claws will certainly separate the two species, while the more general characters above given must be relied on for the other sex.

Occurs in Canada (Pettit), Massachusetts (Blanchard), the coast of New Jersey (Hamilton), northern California and Oregon.

P. diffusus Lec.—Oblong oval, moderately convex, pale piceo-testaceous above, head behind the frontal suture piceous or black, clypeus piceous at middle. Thorax moderately closely punctate, the punctures coarser toward the side, the arcuate and transverse rows of coarser punctures well marked. Elytra a little more coarsely punctured than the thorax, the punctures somewhat coarser, but less dense toward the apex, the usual rows of coarser punctures rather indistinctly impressed. Body beneath and femora piceous opaque, tibiae and tarsi pale. Length .18—.24 inch.; 4.5—6 mm. Pl. iii, fig. 11.

The mesosternal crest is prominent, the lower edge oblique, the anterior edge oblique, the angle feebly mucronate.

The claws of the anterior male feet are dissimilar, the front claw having a large lobe-like tooth at base, which is not in the same plane as the tip of the tooth, so that when viewed directly from above the claw seems double, the posterior claw is less curved and has a rectangular tooth at base. The claws of the

middle and hind feet are all very nearly alike, the tip of the claw being somewhat irregular, the tooth at base rectangular or slightly acute.

The claws of the female are more slender and less curved than the male, and the base is merely slightly broadened without distinct tooth.

This species resembles *Hamiltoni* in form and sculpture, and very nearly in coloration; there is, however, no thoracic piceous space, which seems to be quite characteristic of *Hamiltoni*. The males of the two species are distinguishable by the form of the claws, the tooth of the anterior claw being much more everted here than in any other species. As is usual with all pale species the head is much darker in the female than in the male.

Occurs in Illinois, Dakota, Wyoming, Nebraska and California.

P. reflexipennis Zimm.—Oblong, subdepressed, sides of elytra especially near the apex slightly explanate, color yellowish or pale piceo-testaceous, moderately shining. Thorax moderately closely punctate, the anterior arcuate and posterior transverse series of larger punctures scarcely evident. Elytra more coarsely punctured than the thorax, less closely near the apex, the usual series of larger punctures discernible, but indistinct. Body beneath and femora piceous, tibiae and tarsi pale. Length .14—.18 inch; 3.5—4.5 mm. Pl. iii, fig. 12.

The mesosternal lamina is not large, the lower edge oblique, the front edge oblique and slightly sinuous, the free angle is somewhat mucronate.

The claws of the front tarsi of the male are dissimilar, the anterior claw having a rather long and acute tooth, the posterior strongly angulate at base. The middle claws are like the anterior, but the tooth and angulation are less marked. The posterior claws are dissimilar, and both have a well marked tooth at base, the free portion of the tip forming an angle with the basal portion and is somewhat sinuous.

In the female the claws are dissimilar on all the feet and have merely a slight angulation at base as in the posterior middle claw of male.

This is the only species at present known to me in which the head is always and entirely pale like the remainder of the surface.

Occurs on the sea-coast of Delaware and New Jersey (Dr. Hamilton). One from Bennington, Vt., has been sent me by Mr. C. H. Roberts.

HELOCHARES Muls.

The differences between this genus and *Philydrus* are extremely small, and are practically reduced to the form of the pseudo-basal joint of the maxillary palpus. In this genus it is curved with the concavity to the front and the palpi themselves are longer and more slender. Pl. iii, fig. 1.

The cephalic and thoracic sculpture is about the same in the two genera, but we here observe quite commonly, but by no means con-

stantly, a coarse puncture near the basal edge of the thorax on each side of middle. While in *Philydrus* four irregular series of coarse punctures are observed on the elytra, here we have but two placed on the fifth and ninth intervals.

The presence of a well marked mesosternal lamina in most *Philydrus* and its absence in *Helochaeres* seems not to be a character of any great importance as one species of the former (*ochraceus*) has merely a mesosternal carina, which is nearly as well marked in one of the *Helochaeres* (*normatus*).

The two species known to me are separable as follows :

Mesosternum without trace of carina; mentum entire in front.

maculicollis.

Mesosternum feebly carinate; mentum slightly emarginate.....**normatus.**

The first of these species belongs to the Atlantic region, the other to the Pacific.

H. maculicollis Muls.—Oblong oval, very obviously narrowed in front, subdepressed, moderately shining; color above luteous or piceo-testaceous, thorax with a rather large piceous spot, head with irregular piceous spaces. Thorax closely punctate, punctures coarser toward the sides, the anterior arcuate row of punctures very evident, the transverse series indistinct, basal marginal line absent. Elytra broadest slightly behind the middle; the surface with ten moderately deeply impressed striae, which are rather finely serrately punctured, the striae ending abruptly a short distance in front of the apical margin, the tenth stria distant from the side, scutellar stria short; intervals flat, finely sparsely punctulate, the fifth and ninth intervals with a row of coarser punctures. Body beneath black, feebly shining. Femora piceous, opaque, tibiae and tarsi rufopiceous. Length .16—.22 inch.; 4—5.5 mm.

The prosternum is carinate, but never very distinctly. The mesosternum has a slight tuberosity at middle, somewhat rugose. The claws are similar on all the feet and alike in the sexes, they are feebly curved, slightly dilated at base, but not toothed. In specimens which I suppose to be males the last ventral segment has a slight emargination at the middle of its apex.

Variations have been observed in color and sculpture. In what seem to be fresh and well-preserved specimens the color is luteous, with the usual piceous spot on the thorax, but from this the color becomes gradually darker, seemingly to piceous. The head may be entirely piceous with a pale space in front of the eye, or the occiput only may be dark. In one specimen the entire head is simply margined with piceous.

While the sculpture of the thorax is usually well marked, the punctures close, specimens are seen with fine punctures more widely spaced. The variation in color of head and thoracic sculpture are entirely independent of sex.

Occurs in Ohio, Illinois, Missouri, Kentucky, North Carolina Florida to Texas.

H. normatus Lec.—Oblong oval, narrowed in front, subdepressed, form and color generally of *maculicollis*. Thorax similarly punctured. Elytral striae scarcely impressed, the punctures coarser and less close than in *maculicollis*, and very nearly reaching the apex, the intervals flat, scarcely distinctly punctulate, the fifth and ninth with a row of coarse punctures. Body beneath and legs as in *maculicollis*. Length .20—.22 inch.; 5—5.5 mm.

The prosternum is very feebly carinate. Mesosternum longitudinally feebly carinate, nearly as in *Phil. ochraceus*.

The claws are alike in the sexes and simply slightly thickened at base.

The male has the last ventral segment feebly notched as in *maculicollis*.

While this and the preceding species resemble each other so closely superficially, two important structural characters separate them. In *maculicollis* the apex of the mentum is arcuate, here there is a distinct emargination. The mesosternum also differs in the two species.

The emarginate mentum and feebly carinate mesosternum seem to be the two important characters defining *Chasmogenus* Shp. (Biol. Cent. Am. i, 2, p. 73) founded on a species in which the elytra are not striate. While it would be defensible to place our species in that genus, I am unwilling to that extent to admit the validity of *Chasmogenus*. The color and sculpture vary here as in *maculicollis*, and the elytral striae may be slightly impressed, or consist merely of rows of punctures.

Occurs from San Francisco southward into the peninsula, and thence eastward to Arizona. It is highly probable that it extends also into Mexico.

CYMBIODYTA Bedel.

We owe to the acute observation of Dr. Sharp a knowledge of the fact that in this genus the middle and hind tarsi have completely lost the first joint, which, though quite short, is very readily seen in the other genera. The tarsi are, therefore, heteromerous with the formula 5-4-4.

The maxillary palpi are of moderate length, the pseudo-basal joint being curved in such a manner that the concavity is to the front, being the reverse of *Philydrus*. The curve is, however, not well marked, and in the striate species the joint is so nearly straight that, for purposes of classification, it might well be called so, especially when compared with the convex-forward curve of *Philydrus* or the concave-forward curve of *Helochaeres*. In the non-striate spe-

cies the curve is better marked. In the relation of the last two joints to each other in length our species of *Cymbiodyta* are intermediate between the two sections of *Philydrus*, that is to say, while these joints are not equal in length as in *Enochrus*, the terminal joint is so little shorter than the preceding that, without careful observation, they might be thought equal.

In some of the species there is a faint indication of a carina at the apex of the prosternum. The mesosternum is not laminate as in *Philydrus*, but has in all our species a slightly elevated, transverse ridge, placed directly in front of the intercoxal process of the metasternum. This ridge affects three forms which give useful aid in separating the species. These forms are — straight and directly transverse —, arcuate \curvearrowright , or elevated at middle at an angle so that when viewed from behind it is in the form of Λ with a little broader angle. The last form seen in *fraterculus* and *rotundus* explains the origin or meaning of the spine-like process seen in *Helocombus*.

Contrary to the prevailing tendency in *Philydrus* the basal marginal line of the thorax is never present. The large puncture near the basal margin on each side is quite distinct in all the species, although quite often very indistinct or wanting in some individuals.

The general sculpture is the same as in *Philydrus*, and the same series of coarse punctures on the head and thorax may be observed, and in more than half of the species the elytra have distinct striæ of punctures varying in number from four entire striæ to ten. The rows of coarse punctures which have, apparently, no definite position in *Philydrus* are here distinctly located on the alternate intervals beginning with the third.

In the species belonging to the Atlantic region proper the elytra are not striate; they have, however, the coarse interstitial punctures, which are approximated at apex forming a semblance to striæ, but no trouble need result if the student will compare these with the punctures seen in the striate species. In my former descriptions this error occurred, and it now gives me pleasure to correct it, and at the same time give the proper interpretation of the sculpture.

The underside of the body in sculpture and vestiture is the same as in *Philydrus*, and the femora are finely punctured, pubescent and opaque, except for a short distance near the tip. Sexual characters have not been observed, and the males can be distinguished when the organ is protruded, but apparently not otherwise.

With two exceptions the species are piceous black in color with

lustrous surface becoming paler only by evident immaturity. The two brownish species have a black head, although in *Blanchardi* the sides of the head in front of the eyes are very pale, as is the case in all the pale species of *Philydrus*. Color is as constant a character here as been observed in *Philydrus* and the only difficulty may result from the lack of skill on the part of an observer in properly distinguishing what is an immature specimen of a piceous species, or a discolored example of a brown one.

With these preliminary remarks the student will be enabled to separate the species by the aid of the following analytical table. In counting the striae reference is made only to those which exist as such and not to the traces seen through the elytra when these are pale or immature in color.

Elytra with distinct striae.

All the striae entire; mesosternal transverse ridge straight and feebly elevated.

punctatostriata.

Inner striae much abbreviated.

Six outer striae entire, seventh nearly so; mesosternal ridge angulate and elevated at middle, when viewed posteriorly in form of **A**. Pl. iii, fig. 18d **fraterculus.**

Five outer striae entire; mesosternal ridge straight, transverse, feebly elevated; color piceous, with paler border; coarse punctures of alternate intervals indistinct..... **dorsalis.**

Four outer striae only entire; mesosternal transverse ridge arcuate, feebly elevated; color as in *dorsalis*; coarse punctures of alternate intervals distinct Pl. iii, fig. 18c..... **morata.**

Four outer striae only entire and very feebly impressed; mesosternal ridge feebly elevated, arcuate; color piceo-ochraceous or pale castaneous, head black, thorax with large piceous spot..... **imbellis.**

Elytra without striae (except the sutural).

Form oval; mesosternal ridge well marked; serial punctures of elytra distinct, at least at the sides.

Piceous broadly oval; mesosternal ridge angularly elevated at middle in the form of **A**..... **rotunda.**

Piceous, less broadly oval; mesosternal ridge straight, transverse, feebly elevated. Pl. iii, fig. 18b..... **fimbriata.**

Piceo-ochraceous, head black, with a large yellow spot in front of each eye; mesosternal ridge as in *fimbriata*..... **Blanchardi.**

Form oblong; mesosternal ridge very short, transverse; coarse serial punctures of elytra absent; piceous with paler border. Pl. iii, fig. 18a.

lacustris.

C. punctatostriata Horn.—Form rather broadly oval, scarcely narrowed in front, subdepressed, piceous shining, the entire border somewhat paler. Thorax closely and evenly punctate, the anterior arcuate and the transverse series of coarser punctures distinct, but of few punctures, basal marginal line absent. Elytra with ten entire striae and a short scutellar row of punctures, striae moder-

ately deeply impressed, except the four inner near the base, the punctures gradually coarser near the apex and in the outer striae, and very closely placed, intervals flat, finely punctulate, toward the apex quite smooth, intervals 3-5-7-9 each with a row of coarse punctures. Body beneath piceous, opaque. Femora piceous, opaque and pubescent, tibiae and tarsi rufo-piceous. Length .18—.22 inch.; 4.5—5.5 mm.

Prosternum with a slight trace of a carina near the apex, mesosternum with a short, feebly elevated transverse ridge slightly in front of the coxæ.

The claws are slender and simple in both sexes, and no character has been observed by means of which the sexes may be separated, except when the male organ is protruded.

Occurs in California from Tejon northward, in Lake, Santa Clara and Alameda Counties.

C. fraterculus Sharp.—Oval, slightly oblong, moderately convex, piceous, shining, entire border somewhat paler. Thorax closely punctate, a little more coarsely and less closely toward the sides, the arcuate and transverse rows of coarse punctures distinct, basal marginal line absent. Elytra striato-punctate, the striae being scarcely impressed, there being six or seven entire rows of punctures, the inner rows gradually shorter toward the suture, the punctures of the rows rather coarse and closely placed, intervals punctured similarly to the thorax, but gradually finer and more sparse toward apex, the intervals 3-5-7-9 each with a row of coarse punctures. Body beneath piceous, opaque. Femora piceous, opaque and pubescent, tibiae brownish, tarsi paler. Length .18—.22 inch.; 4.5—5.5 mm.

The prosternum is simple, the mesosternum with a slight elevation, which is broadly conical when seen from in front, and **A** when seen posteriorly.

Tarsal claws slender and simple, sexes not separable, except when the male organ is visible.

In this species there are always six entire rows of punctures, and often a seventh continued by finer punctures to the base, the inner striae are shorter. While the number of entire striae will readily distinguish the species, the most important character is found in the elevation of the transverse ridge of the mesosternum in a short conical process.

Occurs in southern Arizona, extending southward well into Mexico.

C. dorsalis Motsch.—Oval, slightly oblong, scarcely narrowed in front, moderately convex, piceous black, shining, entire border paler. Thorax finely and rather closely punctate, the arcuate and transverse series composed of very fine punctures. Elytra punctured similarly to the thorax, the punctures finer, sparser and less distinct toward the apex, at the sides with five entire striae, which are gradually more impressed toward the side, the punctures coarse, deep and closely placed, especially externally, the inner striae short, composed of finer punctures, the sutural stria deeply impressed, and extending three-fourths to base, scutellar stria very faintly indicated, intervals 3-5-7-9 with a row of coarser punctures faintly indicated. Body beneath piceous opaque. Femora piceous, tibiae and tarsi rufo-piceous. Length .18—.22 inch.; 4.5—5.5 mm.

Prosternum simple, mesosternum with a feebly elevated transverse ridge a short distance in front of the coxæ.

Claws similar in the sexes, slender, slightly broader at base.

Motschulsky describes the species as having five or six striæ, which is correct enough, although it seems to me preferable to count only the five that are well marked. In my previous essay this species is placed as possibly identical with *imbellis* Lec., but specimens were then not known to me agreeing with the description.

The specimens collected in the central and in the mountainous regions have more distinct sculpture than those in the warmer regions further south, where the specimens are much less deeply punctate and generally smoother.

Occurs from middle California southward into the peninsula of California.

C. morata n. sp.—Oval, slightly oblong, not narrowed in front, moderately convex, piceous shining, the entire border paler. Thorax moderately closely punctate, less distinctly and more sparsely toward the sides, the arcuate and transverse rows of coarser punctures scarcely evident. Elytra, near the base, punctured similarly to the thorax, near apex much more finely and sparsely, almost smooth, the outer four striæ moderately impressed and entire, the punctures rather coarse, but not densely crowded, the inner striæ very faintly indicated and scarcely extending more than a third from the apex, sutural stria well impressed and longer, coarser punctures of intervals 3-5-7-9 well impressed. Body beneath piceous opaque. Femora piceous, opaque, tibiæ and tarsi rufo-piceous. Length .20—.24 inch.; 5—6 mm.

Prosternum simple, mesosternum with a slightly elevated arcuate ridge slightly in front of the coxæ.

Claws similar in the sexes, slender, feebly arcuate, slightly broadened at base.

At first sight this species might be mistaken for *dorsalis*, which it resembles superficially in form and color. That species has, however, five entire striæ, this but four, the interstitial coarse punctures are very well marked here and scarcely evident in *dorsalis*.

An immature specimen in my cabinet was formerly referred to *imbellis*, and the number of entire striæ is the same in both species, but in *imbellis* they are not impressed, and the punctures much finer. The color is quite different in the two species also.

Occurs in New Mexico near the Moqui Villages.

C. imbellis Lec.—Oblong oval, scarcely narrower in front, moderately convex, piceo-ochraceous or castaneous, with the border paler. head black, thorax with a large piceous space extending from apex to base. Thorax closely punctulate, punctures a little coarser and less dense toward the sides, the arcuate and transverse rows of coarser punctures distinctly marked. Elytra less closely punctulate than the thorax, the punctures a little coarser and less close toward

the apex, the outer five scarcely impressed, striae entire, composed of moderately impressed, closely placed punctures, the inner striae scarcely reaching the middle from apex, the sutural stria well impressed and longer, the coarser punctures of the intervals 3-5-7-9 barely distinguishable. Body beneath piceous, opaque. Femora piceous, opaque, tibiae and tarsi rufo-testaceous. Length .20-.24 inch.; 5-6 mm.

Prosternum entirely simple, mesosternum with a short, arcuate, transverse ridge, slightly in front of the coxae.

Tarsal claws similar in the sexes, slender, feebly arcuate, slightly broadened toward base.

This species is similar in sculpture to *dorsalis*, but the striae and punctures are much less impressed and the coarser punctures of the alternate intervals very feebly indicated. The mesosternal ridge in that species is a straight transverse line, here it is very strongly arcuate. The color of the two species is also quite distinct, that being always piceous, while this is an indefinite rusty-brown or pale chestnut color, resembling at first sight *Phil. Hamiltoni*.

Occurs in California from Tejon northward.

C. rotunda Say.—Very broadly oval, moderately convex, piceous, shining, border indefinitely paler. Thorax closely punctate, more sparsely toward the sides, the arcuate and transverse series of coarse punctures well marked. Elytra punctured similarly to the thorax, but less closely near the apex, the two inner series of coarse punctures very indistinct, the outer series well marked, sutural stria deeply impressed, extending two-thirds to base. Body beneath black, sub-opaque. Femora and tibiae piceous, the tarsi pale. Length .26-.28 inch.; 6.5-7 mm.

Prosternum simple, mesosternum with a transverse ridge elevated in an angular form so that when viewed posteriorly it presents the form of a broad **A**.

Tarsal claws simple and slender in the two sexes.

This species is the most broadly oval of any in the Philodreid series. In the specimen before me the elytra seem slightly explanate at apex, but this may be an individual character.

In previous papers Dr. LeConte has compared the species with *Hydrobius globosus*, while I have suggested *Philodrus cinctus*. Neither comparison is very satisfactory, inasmuch as it is far less convex than the former and more broadly oval than the latter. It is not very greatly different in form and appearance from some of the larger specimens of *H. fimbriatus*, although more decidedly oval.

It seems to be quite rare in collections, being represented, as far as known to me by one specimen each from the Middle States region and North Carolina in the cabinet of Dr. LeConte and one in my own collected near Tewksbury, Mass., and kindly given me by Mr. Blanchard.

C. fimbriata Mels.—Oval, slightly oblong, very little narrower in front, moderately convex, piceous, shining, the entire border narrowly, but indefinitely paler. Thorax closely punctate on the disc, more sparsely and less deeply at the sides, the arcuate and transverse series well marked. Elytra near base punctured similarly to the thorax, at apex more sparsely and less distinctly, the usual series of coarse punctures well marked, sutural stria deeply impressed three-fourths to base. Body beneath opaque black. Femora opaque black, tibiae piceous, tarsi rufescent. Length .18—.22 inch.; 4.5–5.5 mm.

Prosternum simple, mesosternum with a nearly straight, transverse, elevated ridge.

Claws slender, feebly arcuate, slightly broader at base, similar in the sexes.

This species resembles *Philydrus perplexus*, although a little broader in form. In the present genus its form is intermediate between *laeustris* and *rotunda*. From both species it differs in the form of the mesosternal ridge.

When specimens of this species are immature it is not at first sight easy to separate them from specimens of *Blanchardi*, which may be a little dark from defective preparation, but after one becomes familiar, by examination, with the shape of the two species there need be no great difficulty, especially as it will be observed that *Blanchardi* has the head in front of the eyes pale, while in *fimbriata*, no matter how immature the specimen may be, the head is of one uniform color.

Specimens are known to me from Canada, New England States, Pennsylvania and Texas. It is evidently very widely distributed.

C. Blanchardi n. sp.—Form rather broadly oval, scarcely narrowed in front, moderately convex, piceo-ochraceous, head black, with a large pale space in front of each eye. Thorax moderately closely punctate, more sparsely near the sides, the arcuate and transverse series of coarser punctures not very distinct. Elytra similarly punctured, although a little less closely than the thorax and much more sparsely near the apex, the series of coarser punctures indistinctly represented by a few distant punctures, the outermost series alone being distinct, sutural stria well impressed and reaching rather more than two-thirds to base. Body beneath piceous or brown, opaque, rarely black. Femora and tibiae brownish, tarsi paler. Length .16 inch.; 4 mm.

Prosternum simple, mesosternum with a very distinct, straight, transverse ridge, moderately elevated.

Claws simple and slender in the two sexes.

This species represents, in its color, *imbellis* of the striate series, although there is no discal piceous space on the thorax. It is also very like *Philydrus ochraceus*, but is more broadly oval in form. The character of the mesosternal ridge is very like *fimbriata*. It is the only species of the genus in our fauna in which, with a black head, the sides in front of the eyes are pale, as in many *Philydri*.

Occurs in Vermont (Roberts), Massachusetts (Blanchard), Pennsylvania (Hamilton) and District of Columbia (Ulke).

C. lacustris Lec.—Oval, decidedly oblong, moderately convex, piceous, shining, entire border indeterminately paler. Thorax relatively coarsely and closely punctate, more sparsely and less deeply at the sides, the arcuate and transverse rows of coarse punctures very evident. Elytra punctured similarly to the thorax, but a little less closely and somewhat more sparsely toward the apex, the usual series of coarse punctures never present, except by very rare exception, sutural stria extending nearly three-fourths to base. Body beneath opaque black. Femora opaque, piceous, tibiae and tarsi rufo-piceous. Length .16—.18 inch.; 4—4.5 mm.

The prosternum is simple, the mesosternum has a very short, transverse, elevated line.

The claws are similar in the sexes, slender, feebly arcuate, slightly broadened at base.

This is the smallest species of the genus at present known in our fauna. Its essential characters are—the oblong form, the absent serial coarse punctures of the elytra, and very short transverse ridge of mesosternum. It will also be observed that the last two joints of the maxillary palpi differ very little in length, the terminal joint being only slightly shorter than the preceding.

Occurs in the Lake Superior and Canadian region, eastward to the New England States.

HELOCOMBUS n. g.

Tarsi heteromorous with the formula 5-4-4. Maxillary palpi very long and slender, the pseudo-basal joint curved with the concavity in front, the last joint very distinctly shorter than the preceding. Mesosternum with a broad pyramidal process, when viewed from behind elevated like a narrow Λ and acute at apex. Femora punctured, opaque and pubescent. Tarsal claws distinctly toothed in the male, rather widely dilated at base in the female. Pl. iii, fig. 15.

The thorax has no basal marginal line. Elytra deeply striate, the striae entire, except the sutural and the second, no scutellar stria, interstices without the three or four series of coarse punctures.

This genus, founded on *Philydrus bifidus* Lec., is, to a certain extent, intermediate between *Cymbiodyta* and *Philydrus*. It has the tarsi and pseudo-basal palpus joint of the former and the toothed claws of the greater number of the latter. The mesosternum is peculiar in its protuberance, being structurally a great exaggeration of the form foreshadowed in *H. fraterculus* and *rotundatus*, as has been indicated in the remarks under *Cymbiodyta*.

Cymbiodyta Bedel is said both by that author and Dr. Sharp to have a laminate mesosternum, consequently this species is not referable there, while neither author makes any mention of the toothed claws, nor is there any reference to especially long maxillary palpi.

For the above reasons I feel compelled to separate it, at least for the present, with another generic name, the only other recourse being to continue it with Cymbiodyta, in which it would certainly form a well marked subdivision.

H. bifidus Lec.—Oblong-oval, feebly narrowed in front, piceous, shining, subdepressed. Thorax closely and finely punctate, more coarsely and less closely at the sides, the usual arcuate and transverse rows of coarser punctures well marked, lateral marginal line deeply impressed, basal line wanting. Elytra rather deeply striate, especially at the sides and near the apex, the striae all entire, except the sutural and second, at bottom not punctate, intervals convex at the sides, flatter on the disc, punctate, more coarsely and less closely than the thorax, the sides of each interval slightly crenate, alternate intervals without coarser punctures. Body beneath and eyes black, opaque, tarsi rufo-testaceous. Length .22—.28 inch.; 5.5—7 mm.

Prosternum simple, mesosternum with a pyramidal process, higher than wide at base, when viewed from behind in form of **Λ**.

Claws dissimilar in the sexes and unlike on each pair of feet.

In the male the anterior claw of the front feet has a rather broad but acute triangular tooth, the posterior claw rather abruptly broader at base, but not truly toothed; the middle feet have anterior claws toothed but in a less degree than the front feet; the posterior claw is as in the front feet; the posterior feet have both claws alike, and they are very nearly like the posterior claw of the middle feet.

In the female the claws are merely broadened at base without forming a tooth.

This insect resembles, in form and sculpture, *Hydrobius fuscipes*, but is less convex, and is usually found associated with that species in series sent by collectors. Independently of the more important structural characters, the long and slender maxillary palpi will at once distinguish it.

Occurs in Canada and the Lake Superior region, New England States southward to Georgia (coll. Lec.).

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The species which were of old included in *Hydrobius* seem to have given much more trouble in their separation into tenable genera than *Philydrus*. The following table is the result of a study of the described genera from the literature as far as they are represented in our fauna; *Metacymus* is included for discussion.

Elytra striate, or striato-punctate.....HYDROBIUS.

Elytra with confused punctuation.

Posterior femora glabrous.

Antennæ 9-jointed; mesosternum simple.....ANACÆNA.

Antennæ 7-jointed; mesosternum protuberant.....METACYMUS.

Posterior femur punctulate, opaque and pubescent; mesosternum protuberant.
PARACYMUS.

In addition to the above *Tritonus Muls.* and *Limnoxenus Motsch.* have been suggested, which seem perfectly congeneric with *Hydrobius* as limited above. *Creniphilus Motsch.* was suggested to include two species afterward separated by Thomson as *Anacæna* and *Paracymus*.

Crenitis Bedel should have its place in the table near *Paracymus*. Of it *Bedel* writes as follows: "Distinct from *Hydrobius*, *Paracymus* and *Anacæna* by its scarcely spinulose tibiæ, and from the first two especially by its simple mesosternum and from the last by its prothorax without basal marginal line."

Unfortunately, these characters have no value when the species of our fauna are taken into consideration as will be learned in the following pages.

Moreover, the antennæ are said to be 9-jointed, but a specimen sent me by Dr. Sharp plainly shows 8-jointed antennæ as in *Creniphilus monticola*. It seems to me that the species on which *Crenitis* is founded (*punctato-striatus* Letz.) should take its place in the genus *Creniphilus* and be placed near *monticola*.

Dr. Sharp finds it advisable to include all the species under one generic name, although he separates *Metacymus* by its 7-jointed antennæ.

This genus seems surrounded with much doubt, and while he has suggested in a recent letter that it is related to the *Derallus* series (*i. e.* near *Berosus*) the description and the relationship in which it has been placed hardly warrant such an inference.

While the views expressed later on will be found in accord with those who are not willing to retain *Anacæna* and *Paracymus* distinct, there will be disagreement with those who unite all under *Hydrobius*. Inasmuch as it is impossible to retain those two genera as distinct, it seems to me at least inconvenient to use either name for a union of the two, I have, therefore, reverted to an undescribed name by *Motschulsky*, which had for its types the two species constituting the types of the separate genera. Other remarks on this subject will be found under *Creniphilus*.

The following is the definition of the genera recognized in our fauna :

Elytra either striate or striato-punctate..... **Hydrobius.**
 Elytra with confused punctuation ; head, thorax and elytra, without the series
 of coarse punctures..... **Creniphilus.**

Hydrobius has the middle and posterior tibiæ fimbriate at apex with short, nearly equal, closely set spinules, while in Creniphilus the spinules are relatively long and irregular, not closely placed. Pl. iv, figs. 10-11.

HYDROBIUS Leach.

Maxillary palpi with the terminal joint always longer than the preceding. Prothorax either without or with basal marginal line, in the latter case indistinct and visible only at the sides of base. Elytra more or less deeply striate, or simply with striæ of punctures, interstices usually punctulate or scabrous, and with the coarser series of punctures on the alternate intervals beginning with the third, except in *scabrosus* and *tessellatus*. Femora more or less pubescent beneath, sometimes but feebly near the base. Tibiæ fimbriate at apex with short, closely set spinules. Posterior tarsi slender, not as long as the tibiæ.

It will also be observed in three of the species that the head has the coarser series of punctures forming an arcuate row as in the Philydroid genera, and on the thorax also similar groups, although here they unite in a semicircular row convex to the side margin.

The mesosternal protuberance does not have here the same importance observed elsewhere, as it varies considerably within specific limits, notably in *fuscipes*.

In the present essay the genus is limited to the large species with the elytra striato-punctate, or striate in ten regular series. Even as thus restricted to a small number of species, it is more heterogeneous in aspect than any other genus in the family. On characters which are now admitted to be unimportant nearly every species in the European fauna has at one time or another had a separate generic name suggested for it. Our species would be in the same plight if similar characters were made use of, with the result of unnecessarily complicating the study.

The following analytical table will enable the species to be separated :

Alternate intervals of the elytra, 3-5-7-9, with a row of coarse punctures.

Thorax with the lateral series of coarse punctures; the base without marginal line.

Elytra with well marked striæ; form oblong.....**fuscipes**.

Elytra with rows of fine punctures; form short and very convex.

Posterior femora merely closely punctate near base, not opaque and pubescent. Pl. iv, fig. 7.....**tumidus**.

Posterior femora densely punctulate and pubescent near base and along the upper border. Pl. iv, fig. 4.....**globosus**.

Thorax without the lateral series of coarse punctures; basal marginal line distinct near the sides.....**latus**.

Alternate intervals without the series of coarse punctures.

Thorax with traces of basal marginal line at sides; surface opaque, subgranular; elytra without trace of scutellar stria; form oval, not very convex.....**scabrosus**.

Thorax without trace of basal marginal line; surface shining; elytral striæ deep, the scutellar very well marked, intervals smooth and convex.

tessellatus.

In the table used in my former essay on these insects the carinæ of the pro- and meso-sterna were given considerable prominence as characters for separation, but the increase of material for study has shown that both carinæ are subject in one species or other, to too much variation to enable them to be used with certainty.

H. fuscipes Linn.—Oblong, convex, piceous, shining. Head closely punctate, an arcuate series of coarser punctures on each side of clypeus, a small group within each eye. Thorax finely closely punctate, a little more coarsely, less densely at the sides, the anterior arcuate and posterior oblique series of coarse punctures well marked, basal marginal line entirely wanting. Elytra striate, striæ variable in depth of impression, the two inner and the scutellar striæ very indistinct at base, striæ closely punctate, rather finely on the disc. more coarsely at the sides, intervals flat, not densely punctulate, intervals 3-5-7-9 with the usual series of coarse punctures placed near the outer side of the respective intervals, a less regular series between the tenth stria and the lateral margin. Body beneath opaque black. Legs piceous, the tibiæ sometimes, the tarsi always paler. Femora opaque, densely punctulate and pubescent, except near the tip. Length .26—.32 inch.; 6.5—8.5 mm. Pl. iv, fig. 2.

Prosternum not carinate, mesosternum obtusely elevated in a variable degree.

Tarsal claws simple, merely gradually broader at base.

The most striking variation observable in this species is in the form of the mesosternal protuberance being in some specimens well marked and prominent, forming a distinct angle, while in others it is so reduced as to be merely a slight longitudinal convexity.

The general color of the species is piceous black, but specimens occur with a slight æneous surface lustre, or even violaceous. The

sculpture variation is that usually observed in punctato-striate species, and is never very great.

Occurs over the greater part of the northern regions of the continent and in California, extending southward to the Colorado River. It is a common European species, more abundant in the northern regions.

H. globosus Say.—Slightly oblong, hemispherical, piceous black, shining, surface faintly æneous. Head closely punctate, with the usual series of coarser punctures. Thorax closely punctate, nearly equally over the entire surface, the coarser punctures of the anterior and posterior series united in a curve near the lateral margin, basal marginal line entirely wanting. Elytra with ten entire striæ of moderate punctures, closely placed near the base, more distant toward apex, scutellar stria distinct, striæ not impressed, intervals flat, sparsely, finely punctulate, the usual series of coarser punctures on intervals 3-5-7-9, also between the tenth stria and the margin. Body beneath opaque black. Legs piceous, tarsi rufescent; posterior femora densely punctured and slightly pubescent near the base only, exteriorly coarsely sparsely punctured and shining. Anterior and middle femora densely punctured and pubescent, except near the apex. Length .30 inch.; 7.5 mm. Pl. iv, fig. 4.

Prosternum simple, mesosternum with a prominent triangular lamina, the postero-inferior edge thick.

Tarsal claws simple, similar in the sexes.

This insect appears to have been almost simultaneously described by Say and Germar, and it might be a very difficult question to decide which name has the priority, and no profit would come of the investigation. The name given by Say is now well known, and has been the recognized name for three-fourths of a century. It is rather remarkable that Germar's name, *Sphæridium melænum*, should have been completely lost to sight in our literature.

Occurs in the New England and Middle States.

H. tumidus Lec.—Oval, very little longer than wide, very convex, piceous black, shining, surface with slight æneous lustre. Head moderately closely punctate, with coarse punctures as in *globosus*. Thorax moderately, closely, and equally punctate, coarser punctures as in *globosus*. Elytra striato-punctate, striæ not impressed, punctures not coarse, closely placed near base, sparser and finer near apex, striæ entire, except the sutural and second, scutellar stria not evident, intervals flat, punctate more coarsely than in *globosus*, and with large punctures arranged as in that species. Body beneath opaque black. Legs piceous, tarsi rufescent; posterior femora entirely glabrous, coarsely sparsely punctured, middle femora densely punctured and pubescent near the base only, anterior femora opaque, except near the tip. Length .34 inch.; 8.5 mm. Pl. iv, fig. 7.

Prosternum either with a very small, acute, tubercle at apex, or simple; mesosternum with a lamina as in *globosus*, nearly vertical in front.

By its convexity and color this species greatly resembles *globosus*. The general sculpture is rather coarser, the form more elongate and the femora quite different in sculpture.

Occurs from New York to Florida, but seems rare.

H. latus Horn.—Broadly oval, distinctly narrowed in front, piceous or slightly brownish, feebly shining. Head with coarse and very fine punctures intermixed, not closely placed, a denser group within each eye, clypeus broadly emarginate. Thorax regularly convex, hind angles very obtuse, basal marginal line distinct near the sides, surface with coarse and fine punctures intermixed, rather sparsely placed and feebly impressed at the middle of the disc, dense and much coarser at the sides, the arcuate and oblique series of coarser punctures scarcely discernible. Elytra with ten entire, moderately impressed striae and a short scutellar row of punctures, striae moderately, coarsely crenately punctured, at the sides much more coarsely, intervals flat, faintly scabrous, the 3-5-7-9 with the usual series of coarse punctures. Body beneath opaque black. Legs piceous or brown, the femora of all the legs densely punctulate and pubescent at basal half, but less in the hind femora, smooth and shining at apex. Length .30 inch.; 7.5 mm. Pl. iv, fig. 5.

Prosternum with a distinct cariniform elevation near the apex, mesosternum obtusely protuberant, the lower edge of the protuberance in form of Ω .

Tarsal claws simple and slender in both sexes. The prosternal carina is but small in its greatest development, and in some specimens almost entirely disappears. This species is remarkable in having a sharp line of demarcation between the densely punctulate and the smooth portions of the femora also in having the basal marginal line of thorax distinct at the sides.

Occurs at Fort Crook, California.

H. scabrosus Horn.—Oval, slightly oblong, distinctly narrowed in front, piceous or brown, opaque, or with very feeble lustre. Head coarsely and closely punctate at the sides, smoother at middle, without trace of the arcuate row of punctures, clypeus distinctly emarginate. Thorax regularly convex, a vague depression of the middle of the disc near the posterior margin and a shallow fovea in the place of the puncture seen in other species, hind angles very obtuse, basal marginal line distinct near the hind angles, surface coarsely and densely punctured, rugulose at the sides, smoother at middle. Elytra with ten entire, moderately deeply impressed striae, the scutellar stria entirely wanting, striae coarsely, but vaguely and not closely punctured, intervals flat, granulate or scabrous, disc vaguely depressed each side of suture near apex. Body beneath piceous, opaque. Legs brownish; posterior femora glabrous, coarsely punctate, except for a very small space at base, middle and front femora densely punctured and pubescent one-third from base. Length .20—.24 inch.; 5—6 mm. Pl. iv, fig. 6.

Prosternum finely carinate its entire length, and more elevated in front; mesosternum simple, without trace of protuberance.

Claws slender, feebly curved and simple. The sculpture of the elytra is remarkable in being finely granulate and scabrous. The sutural stria is exactly parallel with the suture to base, so that there is no trace of scutellar stria. The usual coarse punctures of the alternate intervals are not present and are not merely concealed by the other sculpture.

The thoracic depressions near the base, faint as they are, indicate the last vestige of the sculpture usual in *Helophorus*, and the coarse puncture seen on each side of the base of the thorax in so many species is merely the remnant of the sinuous line each side of the median line in *Helophorus*.

Specimens are occasionally seen that are quite black and feebly shining.

Occurs in Vancouver, Oregon and California as far south as San Francisco. A specimen in my cabinet from Arizona is probably from the more northern and mountainous regions of that territory.

H. tessellatus Ziegler.—Broadly oval and very convex, pale castaneous, shining, elytra indistinctly marked with slightly darker, small spaces without definite pattern. Head coarsely, deeply, not closely punctate, clypeus much smoother and moderately deeply emarginate. Thorax coarsely, not closely, but somewhat irregularly punctate, a vague depression opposite the middle of each elytron, hind angles rounded, basal marginal line extremely fine and indistinct. Elytra oval, very nearly as broad as long, very convex, more elevated posterior to base, ten entire striae moderately deeply impressed, scutellar stria well marked and impressed, striae with coarse moderately close, but not crenate punctures, the intervals convex, smooth, the 3-5-7-9 slightly more so than the others, but without trace of the coarse series of punctures. Body beneath brownish, opaque. Legs brown, the basal half of all the femora opaque, punctulate and pubescent. Length .28—.30 inch.; 7—7.5 mm. Pl. iv, fig. 3.

The prosternum has merely a slight elevation in front, mesosternum slightly convex, but without pubescence.

Claws slender and simple in both sexes. The indefinite spots of color are principally at the sides and apex, a large triangular scutellar space being without them.

The curious aspect of this species as compared with the others would suggest the probability of its belonging to a genus or division apart from them, but as I have before remarked there is absolutely nothing which can be used for separation. It is but little more convex than *globosus*, but the anterior portion of the body being more deflexed causes it to appear more so, and while the point of greatest convexity is nearly the same in *globosus* and *tessellatus*, the curve of the elytra when viewed from the side is much more convex here.

The head is less transverse than usual from the fact that the sides of the clypeus are more nearly parallel.

Occurs from Canada southward to Florida and from Massachusetts to Illinois. It seems rare in every locality.

CRENIPHILUS Motsch.

Maxillary palpi short and stout, the terminal joint longer than the preceding. Prothorax without basal marginal line. Elytra never either striate, or with regular series of punctures, sutural stria deep, but obliterated at basal fourth. Posterior femora glabrous, except in *infuscatus*. Posterior tibiae fimbriate at apex with relatively coarse and long spinules, unequal in length and not closely placed. Posterior tarsi variable, sometimes slender and longer than the tibiae, often stouter and rather shorter than tibiae.

In addition to the above diagnosis it may be more specifically stated that the elytra are punctured in a confused manner, although in several of the species a faint tendency to a linear arrangement may be observed, especially near the apex. The head and thorax are entirely deprived of the series of larger coarse punctures so well marked in all the species of the preceding genera, except in three *Hydrobius*. From the manner of elytral sculpture it must be evident that the coarse punctures arranged in series must also be absent. The mesosternum may be either absolutely plain or more or less protuberant, but never greatly. The prosternum is carinate in several species.

In separating our small species of *Hydrobius* from the larger ones, the desirability of which has been admitted by every systematist who has studied them, the question of a name for the series presented itself for serious consideration.

In glancing over our species it will be seen that two forms occur, first those with the posterior femora opaque and pubescent, similar to the other femora, represented in our fauna by *infuscatus* alone, secondly those with glabrous femora to the posterior legs, to which the remainder of our species may be referred. The first series is *Anacæna* Thoms., while the second contains some that are *Paracymus* Thoms., and others that would be excluded. Therefore, neither of the above names can be properly applied to the aggregate series. Castelnau's name *Brachypalpus* would be a very good one, but his genus is composed of *Philydrus* and *Hydrobii*. Mulsant's *Tritonus* is founded on a species very plainly inseparable from *Hydrobius*

proper. Motschulsky's genus *Creniphilus*, although merely indicated and not fully described, has for its types *punctulatus* (= *æneus* Germ.) and *limbatus* (= *globulus* Payk.), which are the types of *Paracymus* and *Anacæna*. For this reason *Creniphilus* is adopted, indicating, as it does, my idea that the other two genera cannot be properly retained as distinct. In his most recent work (Biol. Cent. Am. vol. i, 2) Dr. Sharp has gone a step still further back, and retains *Hydrobius* as adopted by Lacordaire and the authors of the Catalogus.

In glancing over the analytical table there will be observed a very important character relegated to second place, namely, the occurrence of 8-jointed antennæ in two species. To use this character as a means of defining another genus would associate two very unlike species, unlike not only in form, but also in the structure of the two sterna, and the logical result would be the formation of two other genera. If, then, we return to those species with 9-jointed antennæ, one certainly will be an *Anacæna*, while the others must be again separated by the plane (*Paracymus*) or protuberant mesosternum. Thus five genera will be named, all with a more or less complicated nomenclature confusing to the student and without benefit to science.

The question might here be answered as to the reason for ignoring such an important character as the loss of an antennal joint. It will be admitted that, in every family of Coleoptera, there is a standard or normal number of antennal joints, to which in some families all the members conform, while in other families there is a variation in the number, sometimes either below or above the standard, and in the Scarabæidæ, especially, both the latter styles of variation occur within the family limits. In fact, such is the plasticity in the Melolonthide Scarabæidæ, that instances are by no means rare of antennæ having the standard number on one side and a less number on the other, and more even than this, we find more rarely specimens having both antennæ reduced in number of joints from the standard of the species to which the individual undoubtedly belongs.

The antennæ are organs of some sense beyond that of the somewhat mechanical sense of touch, but what that sense is need not be discussed at this time. Whatever it is, the sense is indicated by and resides in specially organized surfaces indicated by punctuation of a peculiar kind, small foveæ, pubescent patches, or otherwise as is familiar to those who go over the entire coleopterous series.

The entire antenna is not sensitive. With very few exceptions it may be stated, as a general rule, that at least three basal joints are

not sensitive, while the number may be still greater, reaching eight in Geotrupini. In many families the greater number of antennal joints have sensitive surfaces, while in others that quality is confined to a limited number of antennal joints. In the first category we find the Adephaga, Elateridæ, Buprestidæ, Cerambycidæ, Chrysomelidæ, while in the second are the Scarabæidæ, the Anobiide and Bostrichide Ptinidæ and Hydrophilidæ. In this latter category the antenna consists of two well defined parts, the sensitive apical and the basal, which has no other function than that of a mechanical support.

It is evident that inasmuch as the basal portion of the antenna is devoid of the structure which makes the antenna an organ of special sense, the *number* of the joints has no importance so long as they subserve their mechanical function. It is in the joints from the second to the sensitive club, of whatever form that club may be, that plasticity of structure is illustrated to the confusion of systematic students.

In the case which has given rise to the preceding discussion we observe constantly two basal joints of nearly equal dimensions in all the species, three terminal sensitive joints not very unlike specifically, and between the two a number constituting a funiculus composed of four joints in all (with three exceptions), some of which are very small, and it is not remarkable that joints 4-5, the smallest of all, should be found to have coalesced in the two species mentioned. For the same reason the existence of a species (or possibly a genus) with a still further reduction to a total of seven joints might have been expected, an occurrence which Dr. Sharp says he has observed in *Metacymus* (Biol. Cent. Am. i, 2, p. 65). As there is no reason to doubt the accuracy of the latter statement, it may be safely asserted that seven joints is the limit beneath which the number will not go in Hydrophilidæ.

The following table will assist in the recognition and arrangement of our species:

- | | |
|--|--------------------|
| Form oblong, fully twice as long as wide; tarsi slender, the posterior fully as long as the tibia; pro- and mesosternum absolutely simple; posterior femora not or feebly pubescent..... | 2. |
| Form elliptical convex, not much longer than wide; tarsi stouter, the posterior pair shorter than the tibiæ | 3. |
| 2.—Elytra parallel, or oblong oval; thorax very distinctly punctate, the sides bordered with pale. | |
| Antennæ 9-jointed..... | dissimilis. |

Thorax with a pale border not alutaceous.

Thorax entirely piceous, and, with the head, alutaceous.....**moratus**.

Antennæ 8-jointed; thorax alutaceous.....**monticola**.

Elytra distinctly narrowed posteriorly almost from the humeri; thorax quite smooth and entirely piceous.....**suturalis**.

3.—Posterior femora longitudinally strigose and sparsely punctate.

Prosternum distinctly carinate; mesosternum with distinct protuberance.

Elytra very indistinctly punctate; antennæ 9-jointed.....**despectus**.

Elytra well punctate; antennæ 8-jointed.....**subcupreus**.

Elytra not punctate; antennæ 7-jointed; mesosternal elevation almost laminiform.....**degener**.

Prosternum absolutely simple.

Mesosternum more or less protuberant, sometimes, however, with a slight tubercle only.....**digestus**.

Mesosternum absolutely plane.....**rufiventris**.

Posterior femora densely punctulate and pubescent, except near the tip; color never a true piceous black and without æneous lustre.

infuscatus.

C. dissimilis Horn.—Oblong, subdepressed, piceous, shining, lateral border of thorax testaceous, more broadly posteriorly, sometimes also the outer portion of the apical border (Pl. iv, fig. 14) sides of elytra indistinctly paler. Antennæ 8-jointed, testaceous, club piceous. Head relatively coarsely and moderately closely punctate. Thorax moderately coarsely and closely punctate, hind angles distinct but obtuse, basal marginal line absent. Elytra oblong, parallel, narrowed at apical third, sutural stria deeply impressed two-thirds to base, surface closely punctured, a little more coarsely than the thorax, when viewed longitudinally forming indistinct lines, the two outer striæ faintly indicated by slightly coarser punctures. Body beneath piceous, opaque. Legs piceous, tibiae and tarsi pale. Posterior femora with a finely punctured, but not opaque space near the base, otherwise smooth and sparsely punctate, anterior and middle femora densely punctulate, opaque and finely pubescent, except the apical third. Length .12—.16 inch.; 3—4 mm.

Prosternum simple, mesosternum without trace of any elevation whatever.

Maxillary palpi stout, the pseudo-basal joint (Pl. iv, fig. 13) especially thickened. Claws slender, simple and feebly curved.

This insect resembles strikingly some of the smaller forms of *Cymbiodyta lacustris*, and is therefore very much less convex and more parallel than usual in the present series.

The two specimens from which the original description was made were plainly immature, the elytra being brown and the legs quite pale, but more mature specimens since obtained are entirely piceous black with the sides of the thorax very decidedly and of the elytra indistinctly paler.

Occurs in Oregon and California as far south as San Francisco.

C. moratus n. sp.—Oblong, subdepressed, piceous black, surface with a very faint bronze lustre. Antennæ 9-jointed, testaceous at base, club piceous. Head moderately coarsely and closely punctate, the intervals very distinctly alutaceous. Thorax moderately, coarsely and closely punctate, more finely on the disc, intervals alutaceous. Elytra oblong parallel, sutural stria distinctly impressed two-thirds to base, surface shining, not alutaceous, punctuation coarser, but not closer than on the thorax, and when viewed longitudinally, especially near the apex, exhibiting a tendency to form rows. Body beneath piceous, opaque. Legs entirely piceous. Posterior femora faintly strigose, sparsely punctate, middle and front femora pubescent and opaque, except at tip. Length .12 inch.; 3 mm.

Prosternum simple, mesosternum without trace of elevation.

Maxillary palpi piceous, stout. Claws slender, simple and feebly curved.

This species may be readily known from either *dissimilis* or *monticola* by its entirely piceous thorax, and while it has the head and thorax distinctly alutaceous as in *monticola*, it has the 9-jointed antennæ of *dissimilis*.

Three specimens collected in Utah were kindly given me by Mr. Charles W. Strumberg.

C. monticola n. sp.—Oblong oval, subdepressed, piceous; elytra ochraceous or pale brown, thorax with pale border at apex, sides and base externally (Pl. iv, fig. 15). Head entirely piceous, finely but not closely punctate, interspaces extremely minutely alutaceous. Antennæ 8-jointed (Pl. iv, fig. 17), testaceous, club piceous. Thorax three times as wide as long, moderately coarsely, but not very closely punctate, the intervals distinctly alutaceous, basal marginal line entirely absent. Elytra oval, sides arcuate, disc more coarsely punctate than the thorax, coarser near the apex, but more sparse, the punctures seen in a longitudinal direction giving the vague appearance of striæ, especially near the sides. Body beneath piceous, opaque. Femora piceous, tibiæ and tarsi rufo-testaceous, femora punctulate, pubescent and opaque, except near the apex, the posterior pair, however, less opaque than the others. Length .10—.14 inch.; 2.5—3.5 mm

Prosternum and mesosternum entirely simple. Maxillary palpi short and moderately stout, the basal joint not especially thickened (Pl. iv, fig. 12). Claws slender and simple.

This species has been supposed to be identical with *dissimilis*, and as far as color goes, fits the description better than the mature specimens of that species. It differs superficially in color, the elytra being always ochraceous, the number of joints of the antennæ and the form of the pseudo-basal joint of the maxillary palpi. The apical margin of the thorax is here always with a pale border, never so in *dissimilis*, except when the specimens are palpably immature.

Occurs abundantly in the White Mountain region of New Hampshire. I have one from Pennsylvania.

C. suturalis Lec.—Oblong oval, narrower posteriorly, moderately convex, piceous black, very shining, side margin of thorax and lateral border of elytra beginning one-third from humerus, yellowish testaceous. Antennæ 9 jointed, testaceous, club darker. Head very indistinctly, sparsely punctate. Thorax very smooth and shining, the punctuation very sparse and fine, indistinct, no basal marginal line, the lateral pale border sharply limited, wider posteriorly. Elytra very smooth and shining, near the base scarcely at all visibly punctate, the punctures, however, quite distinct near the apex and at the sides. Body beneath piceous, opaque. Legs piceous, or rufo-piceous, the tibiæ and tarsi always pale. Posterior femora finely longitudinally strigose, sparsely punctate, not pubescent, middle and front femora densely punctulate, pubescent and opaque, except at apex. Length .06—.08 inch.; 1.5—2 mm.

The prosternum and mesosternum are simple, without trace of carina. The maxillary palpi short and stout as in *monticola*.

This insect has a form in the series entirely its own being distinctly narrowed posteriorly as in *Limnobius*. In my first studies of it in 1873 it cost me considerable trouble to verify all the facts in relation to it from the fact that the small size made it troublesome to handle, and, because at the same time, I was led to differ so completely with the views expressed by Dr. LeConte. The abdomen has the usual number of segments of *Hydrobius*, but in the typical male the usually concealed sixth segment had become unusually prominent, and exhibits at its base a triangular depression, which is explained by an examination of the similar segment in any of the larger species of the tribe.

The original specific description says "*elytris parce subtiliter pubescentibus*," and I have never been able to explain the use of such an expression in reference to an insect so smooth that even the punctuation is indistinct.

Occurs from Canada southward to Georgia, but not yet recorded from New England States.

C. despectus Lec.—Elliptical, very convex, piceous, surface distinctly æneous. Antennæ 9-jointed (Pl. iv, fig. 19), entirely rufo-testaceous. Head impunctate, very finely alutaceous (subgranular with high power). Thorax sparsely, finely and indistinctly punctate, surface rather more distinctly alutaceous than the head, no basal marginal line. Elytra very little more distinctly punctate than the thorax, the punctures distant, intervals distinctly alutaceous. Body beneath piceous. Legs reddish brown; posterior femora finely longitudinally strigose and sparsely obsoletely punctate, middle and anterior femora densely punctulate and pubescent, except at apical third. Length .06 inch.; 1.5 mm.

Prosternum distinctly carinate, mesosternum with a small but acute protuberance. Maxillary palpi as in *monticola*.

This species is so like *subcupreus* that it might be mistaken for some of the smaller and smoother forms. The characters of the sterna and femora are alike in the two species, so that the only absolutely certain method of distinguishing them is in the number of joints of the antennæ. The two species are, however, readily separated by direct comparison, notwithstanding their structural resemblance. In a species so small as this in which the antennæ have a persistent tendency to fold beneath the head, the counting of the joints of the antennæ is extremely troublesome.

Occurs in Massachusetts, Pennsylvania, Michigan and Illinois.

C. subcupreus Say.—Elliptical, convex, piceous, surface very distinctly æneous. Antennæ 8-jointed (Pl. iv. fig. 18), testaceous, club piceous. Front moderately punctate, clypeus more closely and finely. Thorax equally, not closely punctate, intervals smooth, no basal marginal line. Elytra punctured similarly to the thorax, a little less closely and more coarsely toward the apex, without any tendency to a linear arrangement of the punctures. Body beneath piceous, opaque. Legs piceous or brown, the tarsi paler. Posterior femora smooth, with a few scattered punctures, middle and anterior femora punctulate and opaque, except at apical third. Length .06—.08 inch.; 1.5—2 mm.

Prosternum very distinctly carinate, mesosternum with a small, but acutely pyramidal protuberance. Maxillary palpi stout, formed as in *monticola*.

Specimens are of quite common occurrence in which the sides are paler, more distinctly so at the apex. The more northern forms of this insect are far more distinctly punctate than those from the south, and some recently collected by Dr. Hamilton on the sea-coast at Brigantine are, as a series, of smaller size than those found inland.

The antennæ are really 8-jointed, as observed by Dr. LeConte (Proc. Acad. 1855, p. 373), although he afterwards doubted his accuracy, but the character has been verified on a number of specimens by Mr. Blanchard as well as myself.

A very widely distributed species, occurring in the northern portion of the continent from the New England States through Canada to Oregon, thence South through California to Arizona, Texas, New Mexico and Nebraska. In the Atlantic region it is not known to me south of Virginia.

C. degener n. sp.—Elliptical, convex, piceous, faintly bronzed, sides of thorax and elytra rather broadly, but indefinitely paler. Antennæ 7-jointed, rufo-testaceous (Pl. ix, fig. 28). Head piceous black, vertex distinctly punctate, clypeus more finely and sparsely. Thorax shining, very distinctly and moderately closely punctate. Elytra not punctate, the surface finely alutaceous and subopaque, the sutural stria distinct from apex two-thirds toward base. Body

beneath piceous. Legs piceous, tibiae rufo-piceous. Posterior femora shining, longitudinally strigose and sparsely punctate, middle and anterior femora usually punctulate and pubescent, except for a short space at apex. Length .07 inch.; 2 mm. nearly.

Prosternum distinctly carinate, mesosternum with a prominent elevation, almost laminiform, the free angle prominent and acute.

Resembles *despectus*, but larger and less convex. The elytra have no punctures whatever, while in *despectus* there is punctuation, although feebly impressed and indistinct. The comparatively large and prominent mesosternal crest will afford the most certain means of separating the species.

The occurrence of but seven joints to the antennæ is one of the most remarkable characters of this species, and it is only after several examinations with the quarter inch objective of the compound microscope that I have been willing to risk the statement.

One specimen, Tampa, Florida, kindly given me by Mr. E. A. Schwarz.

C. digestus Lec.—Elliptical, convex, piceous black, shining, surface usually with slight bronze lustre. Antennæ 9-jointed (Pl. iv, fig. 20), testaceous, club piceous. Head moderately, closely and evenly punctate, faintly alutaceous. Thorax more than three times as wide as long, rather closely punctate, distinctly alutaceous, basal marginal line faintly evident near the angles. Elytra a little more coarsely and closely punctate at base than the thorax, more coarsely, sparsely and very distinctly substriately near the apex. Body beneath opaque, black. Femora piceous, tibiae and tarsi somewhat paler. Posterior femora very finely longitudinally strigose and sparsely punctate, middle and front femora opaque, punctulate and pubescent, except at apical third. Length .10—.14 inch.; 2.5—3.5 mm.

Prosternum simple, mesosternum with a very small protuberance varying to a small tubercle. Maxillary palpi stout, the pseudo-basal joint thickened as in *dissimilis*.

This species presents no striking peculiarities. In series it is rather larger than the other species, and with rather coarser punctuation. To it *rufiventris* is closely related, and future collections may prove them identical.

Occurs from the mountainous regions of New Hampshire westward through Canada, and southward to New Mexico.

C. rufiventris Horn.—Elliptical, convex, piceous black, shining, surface with slight æneous lustre. Antennæ 9-jointed, basal joints testaceous, club piceous. Head moderately, closely punctate. Thorax moderately punctate, the punctures finer and sparser at middle, denser and coarser at the sides, no basal marginal line. Elytra more coarsely punctate than the thorax, more sparsely and coarsely near the apex, where the punctures tend to become subseriate: at

the sides the two outer striae are sometimes faintly indicated by coarser punctures. Body beneath piceous black, opaque. Legs piceous or brown. Posterior femora finely strigose, sparsely punctate, middle and front femora densely punctate, except at apical third. Length .10—.12 inch.; 2.5—3 mm.

Prosternum simple, mesosternum plane, without trace of any protuberance.

The above description will be found to differ in some points from that based on the unique in my former paper. That now proves to have been an immature specimen, hence the unfortunate trivial name. Superficially, it greatly resembles *digestus*, and it is only by an examination of the mesosternum that the two can be separated. As the protuberance in *digestus* is sometimes either a short, transverse ridge, or even a small tubercle, it may be possible that more material will show the desirability of uniting the two species.

Occurs in Oregon and Washington.

C. infuscatus Mots.—Rather broadly elliptical, convex, fusco-testaceous or ochraceous, head black, usually with a pale spot in front of each eye, suture of elytra narrowly infusate. Antennae 9-jointed, testaceous, club dark. Head usually closely punctulate. Thorax pale piceo-testaceous, with a rhomboidal darker space at middle, an arcuate space each side less dark (Pl. iv, fig. 16), disc distinctly and moderately closely punctate, a little coarser at the sides, no basal marginal line. Elytra piceo-testaceous or ochraceous, the suture narrowly darker, the punctuation a little coarser, but less close than on the thorax, without evidence of linear arrangement. Body beneath piceous, opaque. Legs piceous, tibiae and tarsi usually paler. Femora of all the legs densely punctulate, pubescent and opaque, except for a short distance at apex. Length .08—.10 inch.; 2—2.5 mm.

Prosternum simple, mesosternum with a transverse ridge acutely elevated at middle. Maxillary palpi short and stout, the pseudo-basal joint nearly as thick as in *dissimilis*.

As a rule the legs and antennal club are dark in color, but specimens have been seen with both comparatively pale.

At first sight this insect resembles some of the forms of *Phil. nebulosus*, although rather broader and more convex. The above description applies especially to specimens clean and free of discoloration. Many have merely a general brownish color until properly deprived of grease, while in others the dark spaces of the thorax form an indefinite cloud.

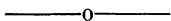
H. feminalis Lec. is one of those latter forms in which the punctuation of the surface is a little less distinct. Similar specimens occur in California.

H. castaneus Lec. is founded on dark, discolored specimens, with the greater portion of the disc of the thorax piceous, merely the

sides paler. The mesosternum is slightly protuberant and within the recognized limits of variation in *infuscatus*, although Dr. LeConte states that the mesosternum is simple.

This species has been compared, very properly, with *globosus* Payk., both species belonging to *Anacæna* Thoms.

Occurs from Oregon southward to San Diego, eastward to Wyoming and Michigan, thence south to New Mexico.



In closing a paper it is always a pleasure to acknowledge the assistance given by friends to whom, during the progress of my own studies, my views have been made known and subjected in advance to that criticism which must follow publication. Therefore, to Dr. Hamilton, Messrs. Blanchard, Ulke and Schwarz, I express my thanks for critical aid as well as for the loan and gift of material.



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maculifrons Motsch., Bull. Mosc. 1859, iii, p. 179.

var. *cristatus* Lec., Synopsis, p. 370; Horn, Revis. p. 127.

latiusculus Motsch., loc. cit. p. 178.

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- C. punctatostriata* Horn (*Philhydrus*), Revis. p. 131.
C. fraterculus Sharp, Biol. Cent. Am. i, 2. p. 71; App. p. 764.
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C. Blanchardi n. sp.
C. lacustris Lec. (*Philhydrus*), Synopsis, p. 369; Horn, Revis. p. 131.

HELOCOMBUS n. g.

- H. bifidus* Lec. (*Philhydrus*), Synopsis, p. 371; Horn, Revis. p. 128.

HYDROBIUS Leach.

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seriatus, insculptus, regularis Lec., Synopsis, p. 272.
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melenum (*Sphæridium*), Germ. Ins. spec. nov. p. 96.
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CRENIPHILUS (Motsch.)

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In addition to the above species Kirby (Fauna Bor. Am. iv) cites *Philhydrus marginellus* and *melanocephalus*, two well known European species, as occurring in Canada. While his identifications are erroneous, the descriptions are not sufficiently definite to determine the species intended, although it is probable that the first is *Cymb. lacustris* and the latter *Phil. nebulosus*.

EXPLANATION OF PLATE III.

- Fig. 1.—Head and claw of *Helochaeres*.
 “ 2.—*Philydrus*, showing the series of punctures.
 “ 3.—*Philydrus* (*Enochrus*).
 “ 4.—*Philydrus consors* ♂, claws, mesosternal plate and penis.
 “ 5.—*Philydrus cinctus* ♂, same details.
 “ 6.—*Philydrus perplexus* ♂, same details.
 “ 7.—*Philydrus carinatus* ♂, same details.
 “ 8.—*Philydrus californicus* ♂ the two claws on each pair of feet, mesosternal plate and penis.
 “ 9.—*Philydrus Hamiltoni* ♂, same details.
 “ 10.—*Philydrus fucatus* ♂, details as in 4.
 “ 11.—*Philydrus diffusus* ♂, details as in 8.
 “ 12.—*Philydrus reflexipennis* ♂, same details.
 “ 13.—*Philydrus nebulosus*, claws of ♂ and penis, mesosternal plates showing variation, sexual and otherwise.
 “ 14.—*Philydrus ochraceus*, mesosternal plate.
 “ 15.—*Helocombus bifidus* ♂, head and claws.
 “ 16.—*Philydrus*, posterior leg.
 “ 17.—*Cymbiodyta*, posterior leg.
 “ 18.—*Cymbiodyta*, mesosternum as seen from a posterior view; *a*, lacustris; *b*, fimbriata; *c*, morata; *d*, fraterculus; *e*, marginella.

EXPLANATION OF PLATE IV.

- Fig. 1.—Head of *Hydrobius*, antennæ a little too large.
 “ 2.—*Hydrobius fuscipes*, femora as seen beneath.
 “ 3.—*Hydrobius tessellatus*, idem.
 “ 4.—*Hydrobius globosus*, idem.
 “ 5.—*Hydrobius latus*, idem.
 “ 6.—*Hydrobius scabrosus*, idem.
 “ 7.—*Hydrobius tumidus*, idem.
 “ 8.—*Creniphilus infuscatus*, idem.
 “ 9.—*Creniphilus digestus*, idem.
 “ 10.—*Hydrobius*, right posterior tibia, under view.
 “ 11.—*Creniphilus*, idem.
 “ 12.—*Creniphilus monticola*, head and palpi.
 “ 13.—*Creniphilus dissimilis*, idem.
 “ 14.—*Creniphilus dissimilis*, coloration of thorax.
 “ 15.—*Creniphilus monticola*, idem.
 “ 16.—*Creniphilus infuscatus*, idem.
 “ 17.—*Creniphilus monticola*, antenna.
 “ 18.—*Creniphilus subcupreus*, idem.
 “ 19.—*Creniphilus despectus* idem.
 “ 20.—*Creniphilus digestus* idem.
 “ 21.—*Helopeltis*, head and palpi.

